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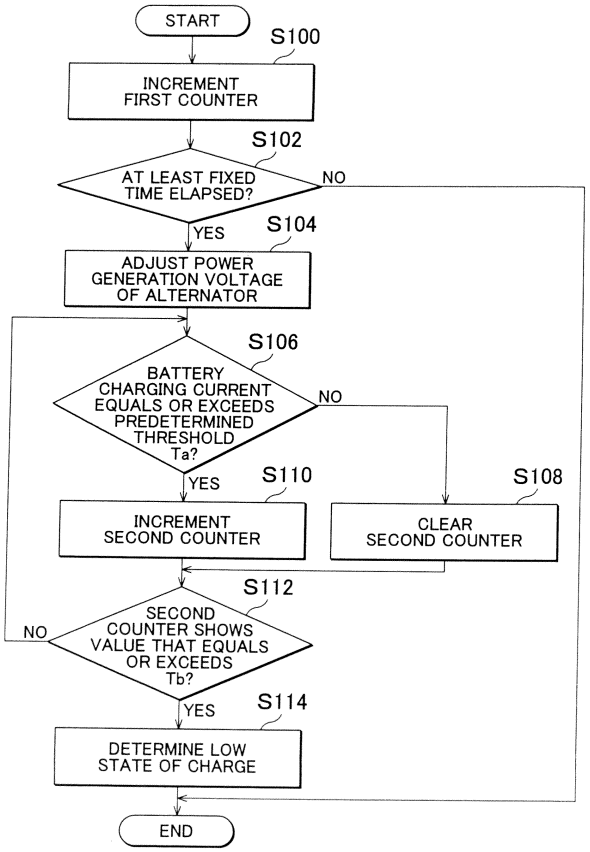
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(54) Battery state of charge determination method and battery state of charge determination apparatus

(57) A power generation voltage of an alternator capable of supplying a charging current to a battery is boosted (Step 104). A determination is then made as to whether or not a condition in which the charging current supplied to the battery equals or exceeds a predetermined threshold has been established continuously for a predetermined time after the power generation voltage of the alternator is boosted (Step 112). The battery is determined to be in a low state of charge condition, in which a state of charge of the battery is equal to or smaller than a predetermined state of charge, when it is determined that the condition in which the battery charging current equals or exceeds the predetermined threshold has been established continuously for the predetermined time (Step 114).

FIG. 3



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EUROPEAN SEARCH REPORT

Application Number
EP 13 15 4498

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 1 562 273 A2 (HONDA MOTOR CO LTD [JP]) 10 August 2005 (2005-08-10)	1,2,4,5	INV. H02J7/16
A	* the whole document *	3,6	

X	EP 1 858 135 A2 (HITACHI LTD [JP]) 21 November 2007 (2007-11-21)	1,2,4,5	
A	* the whole document *	3,6	

X	US 2006/022643 A1 (BROST RON [US] ET AL) 2 February 2006 (2006-02-02)	1,2,4,5	
A	* the whole document *	3,6	

A	JP 2009 054373 A (TOYOTA MOTOR CORP) 12 March 2009 (2009-03-12) * the whole document *	1-6	

TECHNICAL FIELDS SEARCHED (IPC)

H02J
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	15 November 2017	Hunckler, José

CATEGORY OF CITED DOCUMENTS

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15-11-2017

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1562273 A2	10-08-2005	CN 1652427 A	10-08-2005
		EP 1562273 A2	10-08-2005
		JP 2005224013 A	18-08-2005
		KR 20060041711 A	12-05-2006
		US 2005173985 A1	11-08-2005
EP 1858135 A2	21-11-2007	EP 1858135 A2	21-11-2007
		JP 2007312469 A	29-11-2007
		US 2007267997 A1	22-11-2007
US 2006022643 A1	02-02-2006	NONE	
JP 2009054373 A	12-03-2009	JP 5082677 B2	28-11-2012
		JP 2009054373 A	12-03-2009

EPO FORM P0459

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